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IDENTIFIERS	Painters

ABSTRACT

Focusing on motor vehicle and machinery repairers, this document is one in a series of forty-one reprints from the Occupational Outlook Handbook providing current information and employment projections for individual occupations and industries through 1985. The specific occupations covered in this document include automobile body repairers, automobile mechanics, automobile painters, automobile parts counter workers, automobile service advisors, boat-engine mechanics, diesel mechanics, farm equipment mechanics, gasoline service station attendants, motorcycle mechanics, truck mechanics, and bus mechanics. The following information is presented for each occupation or occupational area: a code number referenced to the Dictionary of Occupational Titles; a description of the nature of the work; places of employment; training, other qualifications, and advancement; employment outlook; earnings and working conditions; and sources of additional information. In addition to the forty-one reprints covering individual occupations or occupational areas (CE 017 757-797), a companion document (CE 017 756) presents employment projections for the total labor market and discusses the relationship between job prospects and education. (BM)

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Motor Vehicle and Machinery Repairers

Reprinted from the
Occupational Outlook Handbook,
1978-79 Edition.
U.S. Department of Labor
Bureau of Labor Statistics
1978

Bulletin 1955-24

Containing the midpoints of the legs of right triangle *RST*, whe
pt. (−5, 5), *S* is pt. (1, 1), and *T* is pt. (3, 4).

Containing the longer diagonal of a quadrilateral whose vertic
pts. (2, 2), (−2, −2), (1, −1), and (6, 4).

Show that the equations $y - 1 = \frac{1}{2}(x + 3)$ and $y - 4 = \frac{1}{2}(x$
are equivalent.

An equation of the line containing pts. (−2, 3) and (4, −1) c
written in the form $y - 3 = -\frac{1}{2}(x + 2)$ or in the
$y + 1 = -\frac{1}{2}(x - 4)$, depending upon which point you take
(x_1, y_1). Show that the two equations are equivalent.

Show that the equations are equivalent.

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1) \qquad y - y_2 = \frac{y_1 - y_2}{x_1 - x_2}(x - x$$

State the equation of a line through pt. (p, q) and parallel to
containing pts. (a, b) and (c, d). $(a \neq c)$.

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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CE 017 778

AUTOMOBILE BODY REPAIRERS

(D.O.T. 807.381)

Nature of the Work

Every day thousands of motor vehicles are damaged in traffic accidents. Although some are wrecked, most can be made to look and drive like new. Automobile body repairers are the workers who straighten bent frames, remove dents, and replace crumpled parts that are beyond repair. Usually, they can fix all types of vehicles, but most repairers work mainly on cars and small trucks. A few specialize in working on large trucks, buses, or tractor trailors.

When a damaged vehicle is brought into the shop, body repairers generally receive instructions from their supervisors, who have determined which parts are to be restored or replaced and how much time the job should take.

Automobile body repairers use special machines to align damaged frames and body sections. They chain or clamp the semi-portable alignment machine to the damaged metal and apply hydraulic pressure to straighten it.

Body repairers remove badly damaged sections of body panels with a pneumatic metalcutting gun or acetylene torch, and weld in new sections to replace them. Sometimes, dented sections can be repaired rather than replaced; the repairers push dents out with a hydraulic jack or hand prying bar, or knock them out with a handtool or pneumatic hammer. Small dents and creases can be smoothed out by holding a small anvil against one side of the damaged area while hammering the opposite side. Very small dents and dimples are removed with pick hammers and punches.

Some small dents cannot be worked out of the metal. Body repairers fix these dents by first filling them with plastic or solder. Then, when the filler hardens, they file or grind it to its original shape and sand it smooth for painting. In most shops, automobile painters do the painting. (These workers are discussed elsewhere in the *Handbook*.) Some smaller shops employ workers who do both body repairing and painting.

Body repair work has variety—each damaged vehicle presents a different problem. Therefore, in addition to having a broad knowledge of automobile construction and repair techniques, repairers must develop appropriate methods for each job. Most of these skilled people find their work challenging and take pride in being able to restore automobiles.

Body repairers usually work by themselves with only general directions from supervisors. In some shops, they may be assisted by helpers. In large shops, body repairers may specialize in one type of repair, such as straightening bent frames or repairing doors or fenders.

Places of Employment

About 174,000 persons worked as automobile body repairers in 1976. Most worked for shops that specialized in body repairs and painting, and for automobile and truck dealers. Other employers included organizations that maintain their own motor vehicles, such as trucking companies and buslines. Motor vehicle manufacturers employed a small number of these workers.

Automobile body repairers work in every section of the country, with jobs in this occupation distributed in about the same way as population.

Training, Other Qualifications, and Advancement

Most automobile body repairers learn the trade on the job. They usually start as helpers and pick up skills from experienced workers. Helpers begin by assisting body repairers in tasks such as removing damaged parts and installing repaired parts. They gradually learn to remove small dents and make other minor repairs, and progress to more difficult tasks such as straightening frames. Generally, 3 to 4 years of on-the-job training are needed to become skilled in all aspects of body repair. Most training authorities recommend a 3- or 4-year formal apprenticeship program as the best way to learn the trade, but relatively few of these programs are available. Apprenticeship includes both on-the-job and classroom instruction. Apprentices spend most of their time learning on the job, but they also are expected to attend classes in related subjects such as mathematics, job safety procedures, and business management.

Body repairers usually work by themselves with only general directions from supervisors.

Persons who want to learn this trade should be in good physical condition and know how to use tools. Courses in automobile body repair offered by high schools, vocational schools, and private trade schools provide helpful experience, as do courses in automobile mechanics. Although completion of high school generally is not a requirement, many employers believe graduation indicates that the person has at least some of the qualities of a good worker, such as the ability to see a task through to its completion. The latter is especially important as employers spend a good deal of time and money on training.

Automobile body repairers must buy handtools, but employers usually furnish power tools. The usual pattern is for trainees to accumulate tools as they gain experience. Many workers have a few hundred dollars invested in tools.

An experienced automobile body repairer with supervisory ability may advance to shop supervisor. Many workers open their own body repair shops. In fact, about one of every eight automobile body repairers is self-employed.

Employment Outlook

Employment of automobile body repairers is expected to increase about as fast as the average for all occupations through the mid-1980's.

Employment is expected to increase as a result of the rising number of motor vehicles damaged in traffic. Accidents are expected to increase as the number of motor vehicles grows, even though improved highways, driver training courses, lower speed limits, and improved bumpers and safety features on new vehicles may slow the rate of increase.

In addition to the job openings from employment growth, many openings are expected each year from the need to replace experienced repairers who retire or die. Also job openings will occur as some workers transfer to other occupations.

Most persons who enter the occupation may expect steady work since the automobile repair business is not very sensitive to changes in economic conditions.

Earnings and Working Conditions

Body repairers employed by automobile dealers in 36 large cities had estimated average hourly earnings of $8.20 in 1976, about one and three-fourths times the average for all nonsupervisory workers in private industry, except farming. Skilled body repairers usually earn between two and three times as much as inexperienced helpers and trainees.

Many body repairers employed by automobile dealers and repair shops are paid a commission, usually about half of the labor cost charged to the customer. Under this method, earnings depend on the amount of work assigned to the repairer and how fast it is completed. Employers frequently guarantee their commissioned workers a minimum weekly salary. Helpers and trainees usually receive an hourly rate until they are skilled enough to work on commission. Body repairers who work for trucking companies, buslines, and other organizations that maintain their own vehicles usually receive an hourly wage. Most body repairers work 40 to 48 hours a week.

Automobile body shops are noisy because of the banging of hammers against metal and the whir of power tools. Most shops are well-ventilated, but often they are dusty and have the odor of paint. Body repairers often work in awkward or cramped positions, and much of their work is strenuous and dirty. Hazards include cuts from sharp metal edges, burns from torches and heated metal, and injuries from power tools.

Many automobile body repairers are members of unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.). Most body repairers who are union members work for large automobile dealers, trucking companies, and buslines.

Sources of Additional Information

More details about work opportunities may be obtained from local employers, such as automobile body repair shops and automobile dealers; locals of the unions previously mentioned; or the local office of the State employment service. The State employment service also may be a source of information about apprenticeship and other programs that provide training opportunities.

For general information about the work of automobile body repair workers, write to:

Automotive Service Industry Association, 230 North Michigan Ave., Chicago, Ill. 60601.

Automotive Service Councils Inc., 188 Industrial Dr., Suite 112, Elmhurst, Ill. 60126.

AUTOMOBILE MECHANICS

(D.O.T. 620.131 through .381, .782, and .883; 721.281 and 825.281)

Nature of the Work

Anyone whose car has broken down knows how important the automobile mechanic's job is. The ability to make a quick and accurate diagnosis is one of the mechanic's most valuable skills. It requires good reasoning ability as well as a thorough knowledge of automobiles. In fact, many mechanics consider diagnosing "hard to find" troubles one of their most challenging and satisfying duties.

When mechanical or electrical troubles occur, mechanics first get a description of the symptoms from the owner or, if they work in a dealership, the service advisor who wrote the repair order. If the cause of the trouble is hard to find, the mechanic may test drive the car or use testing equipment, such as motor analyzers, spark plug testers, or compression gauges, to locate the problem. Once the cause of the problem is found,

mechanics make adjustments or repairs. If a part cannot be fixed, they replace it.

Most automobile mechanics perform a variety of repairs; others specialize. For example, *automatic transmission specialists* work on gear trains, couplings, hydraulic pumps, and other parts of automatic transmissions. Because these are complex mechanisms, their repair requires considerable experience and training, including a knowledge of hydraulics. *Tune-up mechanics* adjust the ignition timing and valves, and adjust or replace spark plugs, distributor points, and other parts to ensure efficient engine performance. They often use scientific test equipment to locate malfunctions in fuel and ignition systems.

Automobile air-conditioning specialists install air-conditioners and service components such as compressors and condensers. *Front-end mechanics* align and balance wheels and repair steering mechanisms and suspension systems. They frequently use special alignment equipment and wheel-balancing machines. *Brake mechanics* adjust brakes, replace brake linings, repair hydraulic cylinders, and make other repairs on brake systems. Some mechanics specialize in both brake and front-end work.

Automobile-radiator mechanics clean radiators with caustic solutions, locate and solder leaks, and install new radiator cores. They also may repair heaters and air-conditioners, and solder leaks in gasoline tanks. *Automobile-glass mechanics* replace broken windshield and window glass and repair window operating mechanisms. They install preformed glass to replace curved windows, and they use window patterns and glass-cutting tools to cut replacement glass from flat sheets. In some cases they may repair minor damage, such as pits, rather than replace the window.

To prevent breakdowns, most car owners have their cars checked regularly and parts adjusted, repaired, or replaced before they go bad. This responsibility of the mechanic is vital to safe and trouble-free driving. When doing preventive maintenance, mechanics may follow a checklist to be sure they examine all important parts. The list may include distributor points, spark plugs, carburetor, wheel balance, and other potentially troublesome items.

Places of Employment

Over 700,000 persons worked as automobile mechanics in 1976. Most worked for automobile dealers, automobile repair shops, and gasoline service stations. Others were employed by Federal, State, and local governments, taxicab and automobile leasing companies, and other organizations that repair their own automobiles. Some mechanics also were employed by automobile manufacturers to make final adjustments and repairs at the end of the assembly line. A small number of mechanics worked for department stores that have automobile service facilities.

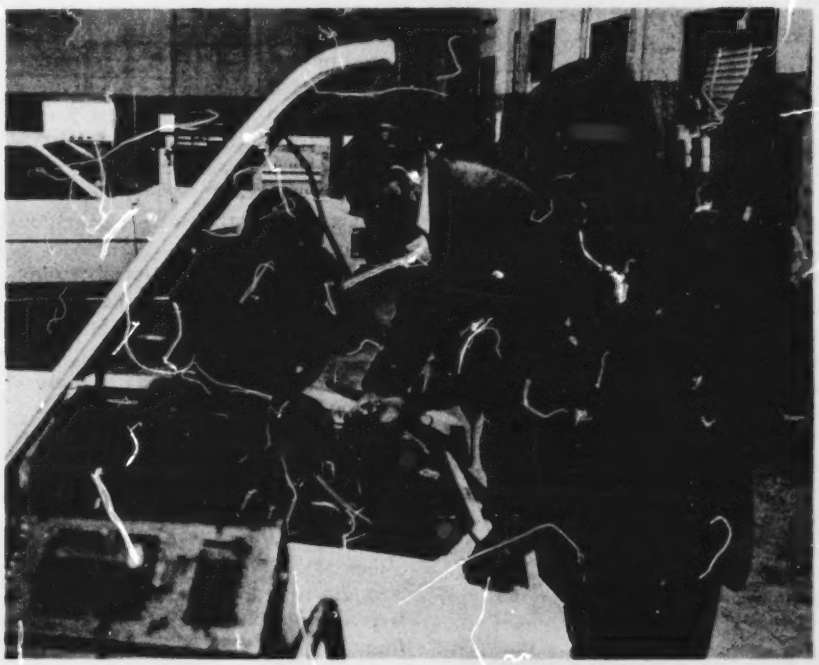
Most automobile mechanics work in shops that employ from one to five mechanics, but some of the largest shops employ more than 100. Generally, automobile dealer shops employ more mechanics than independent shops.

Automobile mechanics work in every section of the country. Geographically, employment is distributed about the same as population.

Training, Other Qualifications, and Advancement

Most automobile mechanics learn the trade on the job. Beginners usually start as helpers, lubrication workers, or gasoline station attendants, and gradually acquire skills by working with experienced mechanics. Although a beginner can make simple repairs after a few months' experience, it usually takes 3 to 4 years to become familiar with all types of repairs. An additional year or two is necessary to learn a difficult specialty, such as automatic transmission repair. In contrast, radiator mechanics, glass mechanics, and brake specialists, who do not need an all-round knowledge of automobile repair, may learn their jobs in about 2 years.

Most training authorities recommend a 3- or 4-year formal apprenticeship program. These programs include both on-the-job training and classroom instruction. On-the-job



Most automobile mechanics learn the trade on the job.

training includes instruction in basic service procedures, such as engine tune-up, as well as instruction in special procedures such as overhauling transmissions. Classroom instruction includes courses in related theory such as mathematics and physics and other areas such as shop safety practices and customer relations.

For entry jobs, employers look for young persons with mechanical aptitude and a knowledge of automobiles. Generally, a driver's license is required as mechanics occasionally have to test drive or deliver cars. Working on cars in the Armed Forces or as a hobby is valuable experience. Completion of high school is an advantage in obtaining an entry job because to most employers it indicates that a young person has at least some of the traits of a good worker, such as perseverance and the ability to learn, and has potential for advancement. Courses in automobile repair offered by many high schools, vocational schools, and private trade schools also are helpful. In particular, courses in physical science and mathematics can help a person better understand how an automobile operates.

The usual practice is for mechanics to buy their handtools and beginners are expected to accumulate tools as they gain experience. Many experienced mechanics have several hundred dollars invested in tools. Employers furnish power tools, engine analyzers, and other test equipment.

Employers sometimes send experienced mechanics to factory training centers to learn to repair new models or to receive special training in subjects such as automatic transmission or air-conditioning repair. Manufacturers also send representatives to local shops to conduct short training sessions. Promising beginners may be selected by automobile dealers to attend factory-sponsored mechanic training programs.

Experienced mechanics who have leadership ability may advance to shop supervisor or service manager. Mechanics who like to work with customers may become service advisors. Many mechanics open their own repair shops or gasoline service stations and about 1 out of 7 automobile mechanics is self-employed.

Employment Outlook

Job opportunities for automobile mechanics will be plentiful in the years ahead. Because this is a large occupation, replacement needs are high. Thus, in addition to openings that will be created by employment growth, thousands of job openings will arise each year due to the need to replace experienced mechanics who retire, die, or change jobs.

Employment of automobile mechanics is expected to increase about as fast as the average for all occupations through the mid-1980's. The number of mechanics is expected to increase because expansion of the driving age population and consumer purchasing power will increase the number of automobiles on the road. Employment also is expected to grow because a greater number of automobiles will be equipped with pollution control and safety devices, air-conditioning, and other features that increase maintenance requirements.

Most persons who enter the occupation may expect steady work because the automobile repair business is not much affected by changes in economic conditions.

Earnings and Working Conditions

Skilled automobile mechanics employed by automobile dealers in 36 cities had estimated average hourly earnings of $7.76 in 1976, about two-thirds more than the average for all nonsupervisory workers in private industry, except farming.

Many experienced mechanics employed by automobile dealers and independent repair shops receive a commission, usually about half the labor cost charged to the customer. Under this method, weekly earnings depend on the amount of work completed by the mechanic. Employers frequently guarantee commissioned mechanics a minimum weekly salary. Skilled mechanics usually earn between two and three times as much as inexperienced helpers and trainees.

Most mechanics work between 40 and 48 hours a week, but many work even longer hours during busy periods. Mechanics paid by the hour frequently receive overtime rates for hours over 40 a week.

Generally, mechanics work indoors. Modern automobile repair shops are well ventilated, lighted, and heated, but older shops may not have these advantages.

Mechanics frequently work with dirty and greasy parts, and in awkward positions. Many of the automobile parts and tools that they must lift are heavy. Minor cuts and bruises are common, but serious accidents can be avoided by keeping the shop clean and orderly and observing other safety practices.

Some mechanics are members of labor unions. Among the unions organizing these workers are the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

For more details about work opportunities, contact local employers such as automobile dealers and repair shops; locals of the unions previously mentioned; or the local office of the State employment service. The State employment service also may have information about apprenticeship and other programs that provide training opportunities.

For general information about the work of automobile mechanics, write to:

Automotive Service Industry Association, 230 North Michigan Ave., Chicago, Ill. 60601.

Automotive Service Councils, Inc., 188 Industrial Dr., Suite 112, Elmhurst, Ill. 60126.

National Automobile Dealers Association, 2000 K St. NW., Washington, D.C. 20006.

AUTOMOBILE PAINTERS

(D.O.T. 845.781)

Nature of the Work

Automobile painters make old and damaged motor vehicles "look like new." These skilled workers repaint older vehicles that have lost the luster of their original paint and make fender and body repairs almost invisible. (Painters who work on the production lines at motor vehicle manufacturing plants are discussed elsewhere in the *Handbook*.)

To prepare an automobile for painting, painters or their helpers remove the original paint or rust using air-or electric-powered sanders and a course grade of sandpaper. Before painting, they also must remove or protect areas which they do not want painted, such as chrome trim, headlights, windows, and mirrors. Painters or their helpers cover these areas with paper and masking tape.

When the car is ready, painters use a spray gun to apply primer coats to the automobile surface. After each coat of primer dries, they sand the surface until it is smooth before applying another coat. Final sanding may be done by hand, using a fine grade of sandpaper. If the surface to be painted is not smooth, the paint job will be rough and uneven. Small nicks and scratches that cannot be removed by sanding are filled with automobile body putty.

Before painting repaired portions of an automobile, painters often have to mix paints to match the color of the car. This important part of the job can be very difficult when painting repaired parts of older cars because the original color often fades over the years.

Before applying paint, painters adjust the nozzle of the spray gun according to the kind of lacquer or enamel being used and, if necessary, they adjust the air-pressure regulator to obtain the correct pressure. If the spray gun is not adjusted properly, the paint may run or go on too thinly. To speed drying, they may place the freshly painted automobile under heat lamps or in a special infrared oven that is sealed to prevent dust and bugs from getting onto the fresh paint. After the paint has dried, painters or their helpers usually polish the newly painted surface.

Places of Employment

About 30,000 persons worked as automobile painters in 1976. Almost two-thirds worked in shops that specialize in automobile repairs. Most others worked for automobile and truck dealers. Some painters worked for organizations that maintained and repaired their own fleets of motor vehicles, such as trucking companies and buslines.

Painters are employed throughout the county, but are concentrated in metropolitan areas.

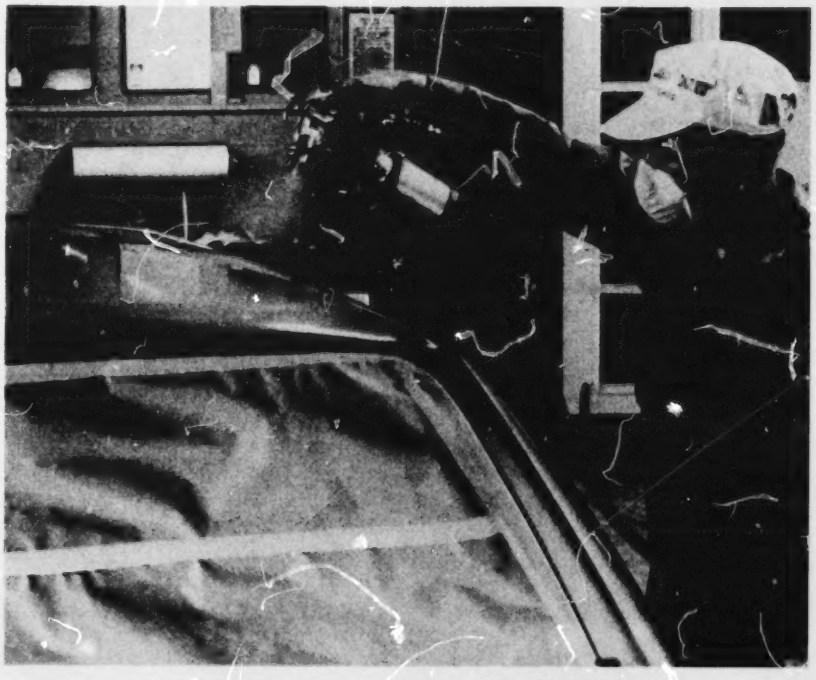
Training, Other Qualifications, and Advancement

Most automobile painters start as helpers and gain their skills informally by working with experienced painters. Beginning helpers usually perform tasks such as removing automobile trim, cleaning and sanding surfaces to be painted, and polishing the finished work. As helpers gain experience, they progress to more complicated tasks, such as mixing paint to achieve a good match and using spray guns to apply primer coats and painting small areas. Becoming skilled in all aspects of automobile painting usually requires 3 to 4 years of on-the-job training.

A small number of automobile painters learn through apprenticeship. Apprenticeship programs, which generally last 3 years, consist of on-the-job training supplemented by classroom instruction in areas such as shop safety practices, proper use of equipment, and general painting theory.

Persons considering this work as a career should have good health, keen eyesight, and a good color sense. Courses in automobile-body repair offered by high schools and vocational schools provide helpful experience. Completion of high school generally is not a requirement but may be an advantage, because to many employers high school graduation indicates that the person has at least some of the traits of a good worker, such as reliability and perseverance.

An experienced automobile painter with supervisory ability may advance to shop supervisor. Many experienced painters with the necessary funds open their own shops.



Automobile painters often acquire their skills by working with experienced painters.

Employment Outlook

Employment of automobile painters is expected to increase about as fast as the average for all occupations through the mid-1980's. In addition to jobs created by growth, several hundred openings are expected to arise each year because of the need to replace experienced painters who retire or die. Openings also will occur as some painters transfer to other occupations.

Employment of automobile painters is expected to increase primarily because more motor vehicles will be damaged in traffic accidents. As the number of vehicles on the road grows, accident losses will grow, even though better highways, lower speed limits, driver training courses, and improved bumpers and other safety features on new vehicles may slow the rate of growth.

Most persons who enter the occupation can expect steady work because the automobile repair business is not affected much by changes in economic conditions.

Job opportunities will be best in heavily populated areas. Many shops in small cities do not have enough business to hire trainees.

Earnings and Working Conditions

Painters employed by automobile dealers in 36 large cities had estimated average hourly earnings of $8.50 in 1976, compared to an average of $4.87 for all nonsupervisory workers in private industry, except farming. Skilled painters usually earn between two and three times as much as inexperienced helpers and trainees.

Many painters employed by automobile dealers and independent repair shops receive a commission based on the labor cost charged to the customer. Under this method, earnings depend largely on the amount of work a painter does and how fast it is completed. Employers frequently guarantee their commissioned painters a minimum weekly salary. Helpers and trainees usually receive an hourly rate until they become sufficiently skilled to work on a commission basis. Trucking companies, buslines, and other organizations that repair their own vehicles usually pay by the hour. Most painters work 40 to 48 hours a week.

Automobile painters are exposed to fumes from paint and paint-mixing ingredients. In most shops, however, the painting is done in special ventilated booths that protect the painters. Painters also wear masks to protect their noses and mouths. Painters must be agile because they often bend and stoop while working to reach all parts of the car.

Many automobile painters belong to unions, including the International Association of Machinists and Aerospace Workers; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.). Most painters who are union members work for the larger automobile dealers, trucking companies, and buslines.

Sources of Additional Information

For more details about work opportunities, contact local employers, such as automobile-body repair shops and automobile dealers; locals of the unions previously mentioned; or the local office of the State employment service. The State employment service also may be a source of information about apprenticeship and other programs that provide training opportunities.

For general information about the work of automobile painters, write:

Automotive Service Industry Association, 230 North Michigan Ave., Chicago, Ill. 60601.

Automotive Service Councils, Inc., 188 Industrial Dr., Suite 112, Elmhurst, Ill. 60126.

AUTOMOBILE PARTS COUNTER WORKERS

(D.O.T. 289.358)

Nature of the Work

Automobile parts counter workers sell replacement parts and accessories for cars, vans, trucks, and other motor vehicles. Those who work in wholesale parts stores sell parts that can be used on many makes and models of vehicles. Their customers include independent repair shops, service stations, self-employed mechanics, and "do-it-yourselfers." Counter workers employed in dealerships usually sell only parts that are made for the makes of vehicles sold by the dealers they work for and spend most of their time supplying parts to the mechanics who work in the dealers' repair shops.

Because of the wide variety of cars and trucks on the road and the growing complexity of automobiles, parts stores must stock thousands of parts ranging from carburetors to rear view mirrors. Parts counter workers must be able to quickly identify and locate any of these parts for their customers, even when customers provide only a general description of the items they want. In order to determine what their customers need, counter workers must have a good knowledge of parts catalogs. In addition, to locate the parts quickly they must be familiar with the layout of the stockroom. If a customer needs a part that is not stocked, counter workers may suggest that they use one that is interchangeable, place a special order for the part with the manufacturer, or refer the customer to another dealer or store.

Once they have obtained the parts the customers want, counter workers use price lists to determine the costs of the parts. They then fill out sales receipts and collect from their customers. When necessary they package items sold.

In addition to selling, counter workers keep parts catalogs and price lists up to date, replenish stock, and unpack incoming shipments. They also take care of the paperwork involved in selling, such as recording sales, taking inventories, and ordering parts from manufacturers. In large firms, stock and receiving clerks do some of this work.

When counter workers do not have in stock the specific part a customer wants, they may use measuring devices, such as micrometers

In large firms, computers are used to maintain inventory, order parts, and keep price lists up to date.

or calipers, to see if a part that is in stock would fit the customer's needs. Sometimes customers are not sure what is wrong with their car or which parts need to be replaced. On these occasions, counter workers may use coil condenser testers, spark plug testers, and other equipment to identify defective parts. In some firms, particularly small wholesale stores, counter workers repair parts. For example, instead of replacing brakes they may repair them using equipment such as brake riveting machines and brake drum lathes.

Places of Employment

About 75,000 persons worked as automobile parts counter workers in 1976. Automobile dealers and parts wholesalers employed most of them. Dealers typically employed one to four counter workers; many wholesalers employed more than four. Other employers include truck dealers, retail automobile parts stores, and warehouse distributors of automotive parts. Trucking companies and buslines employ counter workers to maintain their stockrooms and dispense parts to mechanics who repair their fleets; however, these workers usually do not sell parts to customers.

Because dealerships and automobile parts stores are located throughout the country, parts counter workers are employed in almost every town and city. Those who work for warehouse distributors, trucking companies, and buslines are employed mainly in large cities.

Training, Other Qualifications and Advancement

Most parts counter workers learn the trade on the job. Beginners usually start as parts deliverers or trainees. In some large firms, beginners work as stock or receiving clerks. (See statements on stock clerks and receiving clerks elsewhere in the *Handbook*.) By filling out order forms and restocking shelves, trainees gradually familiarize themselves with the different types of parts, the use of catalogs and price lists, and the layout of the stockroom. Although trainees may wait on customers after a few months' experience, it generally takes about 2 years for a counter worker to become capable of handling every aspect of the job.

Automobile parts counter workers should have a good knowledge of how motor vehicles work and the functions of vehicle parts. The ability to work with numbers also is important. Employers generally prefer high school graduates for entry jobs. Courses in automobile mechanics, commercial arithmetic, merchandising, selling, and bookkeeping are helpful to young persons interested in becoming parts counter workers. Practical experience from working in a gasoline service station or automobile repair shop, or working on cars as a hobby also is helpful.

Since they deal with the public in many cases, persons considering careers as automobile parts counter workers should be neat, friendly, and tactful. A good memory and the ability to write legibly and concentrate on details also are important.

Counter workers with supervisory and business management ability may become parts department managers or store managers. Others who are especially good at dealing with people may become outside sales representatives for parts wholesalers and distributor These people sell parts to automobile repair shops, service stations, trucking companies, and other businesses that buy parts and accessories in large quantities. Some counter workers open their own automobile parts stores.

Employment Outlook

Employment of automobile parts counter workers is expected to increase faster than the average for all occupations. The number of vehicles in use will increase as population grows and incomes rise, allowing people to own more than one vehicle. Changes in styling and engineering of new cars and trucks will create more demand for new accessories and replacement parts. Also, as cars become more expensive, people may attempt to keep their cars longer, and create additional demand for replacement parts.

Besides jobs from employment growth, many openings are expected to be created annually because of the need to replace experienced workers who retire, die, or transfer to other occupations. The number of openings due to growth is not expected to fluctuate significantly from year to year because the demand for automobile parts, unlike some products, is not very sensitive to changing economic conditions.

Earnings and Working Conditions

Automobile parts counter workers are paid a weekly or monthly salary, or an hourly wage rate. In addition, they may receive commissions on sales. Counter workers employed by automobile dealers in 36 large cities had estimated average earnings of $5.08 an hour in 1976, slightly higher than the average for all nonsupervisory workers in private industry, except farming.

Parts counter workers typically work 40 to 48 hours a week. Because many customers find it convenient to shop on weekends, many counter workers work half a day on Saturday.

Stockrooms usually are clean and well lighted. The work is not physically strenuous, but counter workers spend much time standing or walking. They have to work rapidly, and often must wait on customers and answer telephone calls at the same time.

Many parts counter workers are members of the following unions: the International Association of Machinists and Aerospace Workers; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

Details about employment opportunities may be obtained from local automobile dealers and parts wholesalers, locals of the unions previously mentioned, or the local office of the State employment service.

For general information about the occupation, write to:

Automotive Service Industry Association, 230 N. Michigan Ave., Chicago, Ill. 60601.

National Automotive Parts Association, 10400 West Higgins Rd., Rosemont, Ill. 60018.

AUTOMOBILE SERVICE ADVISORS

(D.O.T. 620.281)

Nature of the Work

Service advisors are the link between customers and mechanics in many automobile dealerships and in some large independent garages. When customers bring their cars into the service department, service advisors (sometimes called service salesworkers or service writers) find out what needs to be done and arrange for mechanics to do the work.

For routine maintenance, service advisors merely make out a repair order listing the work that the customer wants done. The order includes the customer's name and address, and make and year of the car. If a factory warranty covers the repairs, the advisor also records the engine and body numbers, mileage, and date of purchase.

There are many times, however, when customers complain of problems that could have a variety of causes. In such cases, service advisors attempt to find out as much as possible about the problem. For example, if a customer says the car is hard to start, the advisor would ask if this happens when the engine is cold or after it warms up. Or, if the complaint is a strange noise, the advisor may look the car over, or test drive the car. The advisor then writes a brief description of the symptoms of the problem, as well as any conclusion about the probable cause, on the repair order to help the mechanic locate the trouble's source.

After writing the repair order, service advisors tell the customer what

Service advisor prepares repair order.

repairs are needed, their approximate cost, and how long the work will take. Since this cannot always be done until mechanics have inspected the cars, service advisors may phone the customers later to give them this information and to ask permission to do the work. Sometime customers are reluctant to authorize expensive repairs even if they are necessary so service advisors may assure them that the work will improve performance and safety, and prevent more serious trouble.

Service advisors give repair orders to the shop dispatcher who figures the cost of the parts and labor needed for each order and assigns work to mechanics. In some shops however, advisors compute repair costs. Service advisors also are responsible for answering any questions the mechanics may have about a repair order. When the work is finished, service advisors may test drive cars to be sure all problems have been corrected.

When the customer returns for the car, the service advisor answers any questions about the repairs and settles complaints about their cost or quality. If the customers want to return the car to the shop or want the cost of the repairs adjusted, the advisor usually must get permission from the service manager. In some dealerships, the most experienced service advisors substitute for service managers when they are absent.

In addition to advising customers on their service needs, service advisors occasinally assist customers in selecting accessories for their cars. For example, a customer who wants to add an air-conditioner may check with a service advisor to be sure that the one selected will not cause the car's engine to overheat.

Places of Employment

More than 20,000 persons worked as automobile service advisors in 1976. Most worked for large automobile dealers because dealerships with less than 20 employees usually do not employ service advisors. Some worked for large independent automobile repair shops.

Training, Other Qualifications, and Advancement

Service advisors learn on the job under the guidance of experienced service advisors and the service manager. In many service departments, trainees begin by helping the shop dispatcher. They learn how to route work to the shop mechanics, to compute repair costs, and to estimate the time required for different repairs. Beginners usually can gain enough knowledge and experience in 1 to 2 years to handle almost every type of repair, but learning to estimate the cost of automobile body repairs may take a longer time, as body damage is often very difficult to see and identify. In addition to on-the-job training, some advisors attend formal training programs conducted by automobile manufacturers.

When hiring persons for jobs as service advisor trainees, employers prefer high school graduates who are 21 years of age and who have experience in automobile repair or related activities, such as assignment to the motor pool in the Armed Forces. Often employers fill these jobs by promoting persons who have worked as mechanic trainees or parts counter worker trainees within their own organization. Some firms prefer to hire mechanics who are experienced in all aspects of automobile repair.

Many autombile dealers consider service advisors their most important employees, because they can promote dealership loyalty and thus build repeat business by winning customer confidence.

Therefore, employers look for applicants who are neat, courteous, even-tempered, attentive listeners, and good conversationalists. High school and vocational school courses in automobile mechanics, commercial arithmetic, sales, public speaking, and English are helpful.

Service advisors with supervisory ability may advance to shop supervisors or to service managers. Some open their own automobile repair shops.

Employment Outlook

Employment in this small occupation is expected to increase about as fast as the average for all occupations through the mid-1980's. Not only will there be more automobiles on the road, but also future technology and design will make cars more complex. As a result, more service advisors will be needed. In addition to the job openings resulting from employment growth, hundreds of openings will arise each year due to the need to replace experienced service advisors who retire, die, or leave the occupation for other reasons. The number of openings is expected to be fairly stable from year to year, because the demand for automobile repairs is not very sensitive to changing economic conditions.

Job openings for service advisors will be concentrated in large automobile dealerships, most of which are located in heavily populated areas. In small towns, many dealers do not have enough repair business to hire service advisors so shop supervisors do the work instead.

Earnings and Working Conditions

Service advisors employed by automobile dealers in 36 large cities had estimated average earnings of $6.45 an hour in late 1976, more than one-third higher than the average for all nonsupervisory workers in private industry, except farming.

Many service advisors are paid a salary plus a commission, that is, a percentage of the cost of repairs or accessories that their customers paid for. Others are paid a straight commission.

Most service advisors work 40 to 48 hours a week. They are busiest in the early morning when most customers bring their cars in for repairs, and in late afternoon when they return to pick them up. During these peak hours, advisors may have to rush to wait on customers. In addition, they occasionally have to deal with angry customers who question or are not satisfied with the repairs made on their cars.

Service advisors spend most of their time standing or walking around the lot and garage in all kinds of weather. But the work is not physically strenuous.

Unions that organize service advisors include the International Association of Machinists and Aerospace Workers; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffers, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

Details on employment opportunities may be obtained from local automobile dealers or repair shops; locals of the unions previously mentioned; or the local office of the State employment service.

For general information about the work of automobile service advisors, write to:

Automotive Service Industry Association, 230 N. Michigan Ave., Chicago, Ill. 60601.

Automotive Service Councils, Inc., 188 Industrial Dr. Suite 112, Elmhurst Ill. 60126

BOAT-ENGINE MECHANICS

(D.O.T. 623.281 and 625.281)

Nature of the Work

Boat engines have many things in common with automobile engines, including unannounced breakdowns. A reliable engine is particularly essential in boating. Breakdowns far from shore can leave a boater stranded for hours—a frustrating and potentially dangerous predicament if the weather turns bad.

To minimize the possibility of breakdowns, engine manufacturers recommend periodic inspections of engines by qualified mechanics to have engines examined and repaired and worn or defective parts replaced. Also, at periodic intervals the mechanic may replace ignition points, adjust valves, and clean the carburetor. After completing these tasks, the engine will be run to check for other needed adjustments. Routine maintenance jobs normally make up most of the mechanic's workload.

When breakdowns occur, mechanics diagnose the cause and repair faulty parts. A quick and accurate diagnosis—one of the mechanic's most valuable skills—requires problem-solving ability as well as a thorough knowledge of the engine's operation. Some jobs require only the replacement of a single item, such as a fuel pump, and may be completed in less than an hour. In contrast, tearing down and reassembling an engine to replace worn valves, bearings, or piston rings may take a day or more.

Mechanics may specialize in either outboard or inboard engines, although many repair both. Most small boats have portable gasoline-fueled outboard engines. Larger craft such as cabin cruisers and commercial fishing boats are powered by inboard engines (located inside the boat) and are similar to automobile engines. Some inboards burn diesel fuel rather than gasoline.

In large shops, mechanics usually work only on engines and other running gear. In small shops they also may patch and paint hulls and repair steering mechanisms, lights, and other boat equipment, such as refrigerators, two-way radios, and depth finders. In addition, they may repair enginecycles, mini-bikes, snowmobiles, lawnmowers, and other machines which have small gasoline engines that are similar to outboard engines.

Mechanics use common handtools such as screwdrivers and wrenches; power and machine tools, including drills and grinders; and hoists to lift engines and boats. Engine analyzers, compression gauges, and other testing devices help mechanics locate faulty parts. Mechanics refer to service manuals for assistance in assembling and repairing engines.

Places of Employment

Most of the 15,000 full-time boat-engine mechanics employed in 1976 worked in the shops of boat dealers and marinas. The next largest area of employment was in boat manufacturing plants where mechanics are employed to make final adjustments and repairs at the end of assembly lines. A small number of mechanics worked for boat rental firms. Marinas operated by Federal, State, and local governments also employed mechanics.

Dealer and marina shops typically employ one to three mechanics; few employ more than 10. Some small

Mechanic removes outboard engine to perform more extensive repairs.

dealers and marinas do not employ mechanics; owners do the repair work or send it to larger shops.

Boat-engine mechanics work in every State, but employment is concentrated along coastal areas in Florida, Texas, New York, California, Louisiana, Washington, and New Jersey, and near the numerous lakes and rivers in Michigan, Minnesota, Wisconsin, Illinois, Ohio, Indiana, and Missouri. Mechanics who specialize in outboard engines work in all areas. Those who specialize in inboard engines generally work near oceans, bays, and large lakes.

Training, Other Qualifications, and Advancement

Boat-engine mechanics learn the trade on the job. At first, trainees clean boats and engines and do other odd jobs. Then, under the guidance of experienced mechanics, trainees learn to do other routine mechanical tasks such as replacing ignition points and spark plugs. As trainees gain experience, they progress to more difficult tasks such as diagnosing the cause of breakdowns and overhauling engines. Generally, an inexperienced beginner needs 2 to 3 years on the job to become skilled in repairing both outboard and inboard gasoline engines. A capable mechanic can learn to repair diesels in an additional year or two.

Employers sometimes send trainees and mechanics to factory-sponsored courses for 1 to 2 weeks. Trainees learn the fundamentals of engine repair. Mechanics upgrade their skills and learn to repair new models.

In the past few years, several schools around the country have begun to offer formal training courses in marine engine repair and maintenance.

When hiring trainees, employers look for persons who have mechanical aptitude, are in good physical condition, and have an interest in boating. High school graduates are preferred, but many employers will hire people with less education. High school courses in small engine repair, automobile mechanics, machine shop, and science are helpful. Before graduating, a person may be able to get a summer job as a mechanic trainee.

Mechanics usually are required to furnish their own handtools. Beginners are expected to accumulate tools as they gain experience. Many experienced mechanics have several hundred dollars invested in tools. Employers provide power tools and test equipment.

Mechanics with leadership ability can advance to supervisory positions such as shop supervisor or service manager. Some boat-engine mechanics transfer to jobs as automobile mechanics. Others may become sales representatives. Mechanics who have the necessary capital may open their own dealerships or marinas.

Employment Outlook

Employment of boat-engine mechanics is expected to grow about as fast the average for all occupations through the mid-1980's. In addition to new positions, a few hundred openings will arise each year as experienced mechanics retire, die, or transfer to other occupations.

Employment is expected to increase due to the growth in the number of boats. The number of boats is expected to increase at about the same rate as the economy as a whole. As population grows, and people have more time for recreation, boating, like other leisure activities, will probably expand.

Employment opportunities will be particularly favorable for mechanics who have a knowledge of electricity and electronics. Electrical appliances are becoming more common on boats, and many new boats have two-way radios and depth finders.

Earnings and Working Conditions

According to a nationwide survey of boat dealers and marinas, estimated hourly earnings of experienced mechanics ranged from about $3.50 to $9.75 in 1976. Experienced mechanics generally earned two to three times as much as trainees.

Most mechanics are paid an hourly rate or weekly salary. Others are paid a percentage—usually 50 percent—of the labor charge for each repair job. If mechanics are paid on a percentage basis, their weekly earnings depend on the amount of work they are assigned and on the length of time they take to complete it.

Boating activity increases sharply as the weather grows warmer. Consequently, many mechanics work more than 40 hours a week in spring and summer. During the peak season, some mechanics may work 7 days a week. However, in the winter, they may work less than 40 hours a week; a relatively small number are laid off. In Northern States, some of the winter slack is taken up by repair work on snowmobiles.

The work is not hazardous, but mechanics sometimes suffer cuts, bruises, and other minor injuries. Shop working conditions vary from clean and spacious to dingy and cramped. All shops are noisy when engines are being tested. Mechanics occasionally must work in awkward positions to adjust or replace parts. For many mechanics, however, these disadvantages are more than compensated for by the variety of assignments and the satisfaction that comes from solving problems. Moreover, mechanics may enjoy working near water recreation areas.

Sources of Additional Information

For details about training or work opportunities, contact local boat dealers and marinas or local State employment offices.

DIESEL MECHANICS

(D.O.T. 625.281)

Nature of the Work

Diesel engines are stronger and thus last longer than gasoline engines. In addition, they use fuel more efficiently than gasoline engines because the higher compression ratios found in diesel engines convert a

higher percentage of the fuel into power. Because of their greater durability and efficiency, diesel engines are used to power most of the Nation's heavy vehicles and equipment.

Diesel mechanics repair and maintain diesel engines that power transportation equipment, such as heavy trucks, buses, boats, and locomotives; and construction equipment, such as bulldozers and cranes. They also service diesel farm tractors and a variety of other diesel-powered equipment, such as compressors and pumps used in oil well drilling and in irrigation.

Before making repairs, diesel mechanics may use devices such as dynamometers to inspect and test engine components to determine why an engine is not operating properly. After locating the trouble, they repair or replace defective parts and make adjustments. Preventive maintenance—avoiding trouble before it starts—is another major responsibility. For example, they may periodically inspect, test, and adjust engine parts such as fan belts and fuel filters.

Many mechanics make all types of diesel engine repairs. Others specialize, in rebuilding engines, for example, or in repairing fuel injection systems, turbochargers, cylinder heads, or starting systems. Some also repair large natural gas engines used to power generators and other industrial equipment. In addition to maintaining and repairing engines, diesel mechanics may work on other parts of diesel-powered equipment, such as brakes and transmissions.

Most workers who maintain and repair diesel engines are not called diesel mechanics. Instead, their job titles usually indicate the type of diesel equipment they repair. For example, workers who maintain and repair diesel trucks or buses are called truck or bus mechanics and those who work on diesel farm tractors are called farm equipment mechanics. Many of these occupations are discussed elsewhere in the *Handbook*. (See statements on truck mechanics, bus mechanics, automobile mechanics, and farm equipment mechanics.)

Diesel mechanics use pliers, wrenches, screwdrivers, and other common handtools as well as special tools, such as valve refacers and piston pin-fitting machines. In addition, they may use complex testing equipment, such as a dynamometer to measure engine power, and special fuel injection testing equipment. Mechanics also may use machine tools to make replacement parts. They use powered hoists and other equipment for lifting and moving heavy parts.

Diesel mechanics repair and maintain a variety of diesel-powered equipment.

Places of Employment

About 100,000 persons worked as diesel mechanics in 1976. Many worked for distributors and dealers that sell diesel engines, farm and construction equipment, and trucks. Others were employed by buslines, construction firms, and government agencies such as State highway departments. Some mechanics worked for diesel engine manufacturers and independent repair shops that specialize in diesels.

Because diesel engines are used throughout the country, diesel mechanics are employed in almost every town and city. However, those who work for trucking companies and buslines are employed mainly in large cities.

Training, Other Qualifications, and Advancement

Diesel mechanics learn their skills in several different ways. Many begin by repairing gasoline-powered automobiles, trucks, and buses. They usually start as helpers to experienced gasoline engine mechanics, becoming skilled in all types of repairs in 3 or 4 years. If the garage or business they work for uses or repairs diesel equipment, they receive several months of additional training in servicing this equipment. While learning to fix engines on the job, many find it helpful to take courses in diesel equipment maintenance offered by vocational, trade, and correspondence schools.

A few mechanics learn their trade through formal apprenticeship programs. These programs, which generally last 4 years, give trainees a combination of classroom training and practical experience. The classroom instruction usually covers blueprint reading, hydraulics, welding, and other subjects related to diesel repair.

Still another method of entry is through full-time attendance at trade or technical schools that offer train-

ing in diesel engine maintenance and repair. These programs generally last from several months to 2 years and provide classroom instruction and often practical experience. Graduates, however, usually need additional on-the-job training before they are capable of handling all types of diesel repair.

Experienced mechanics employed by companies that sell diesel-powered equipment sometimes are sent to special training classes conducted by engine manufacturers. In these classes, mechanics learn to maintain and repair the latest engines, using the most modern equipment. In addition, they may receive training in specialties such as engine rebuilding.

Employers prefer trainees and apprenticeship applicants who have a high school or vocational school education and mechanical ability. Shop courses in blueprint reading, automobile repair, and machine shop work are helpful, as are courses in science and mathematics. Because the work often requires lifting heavy parts, persons interested in becoming diesel mechanics should be in good physical condition.

Many diesel mechanics have to buy their own handtools and beginners are expected to accumulate tools as they gain experience. Experienced mechanics usually have several hundred dollars invested in their tools.

Mechanics who work for organizations that operate or repair large numbers of diesel engines, such as buslines or diesel equipment distributors, may advance to a supervisory position, such as shop supervisor or service manager.

Employment Outlook

Employment of diesel mechanics is expected to increase faster than the average for all occupations through the mid-1980's. In addition to the jobs arising from employment growth, many openings will result from the need to replace experienced mechanics who transfer to other occupations, retire, or die.

Increased employment of mechanics is expected mainly because most industries that use diesel engines are expected to expand their activities in the years ahead. In addition, diesel engines will continue to replace gasoline engines in trucks, buses, and other equipment because properly tuned diesels use less fuel and produce less pollution.

Most new job openings in this field will be filled by mechanics who have experience in repairing gasoline engines. Companies that replace gasoline engine equipment with diesel-powered equipment usually retrain their experienced mechanics. Persons who have school training in diesel repair, but no practical experience, may be able to find jobs only as trainees.

Earnings and Working Conditions

According to a 1975-76 wage survey covering 36 metropolitan areas, mechanics employed by trucking companies, buslines, and other firms that maintain their own vehicles earned an average hourly wage of $6.67, more than one-third above the average for all nonsupervisory workers in private industry, except farming.

Diesel mechanics usually work 40 to 48 hours a week. Many work at night or on weekends, particularly if they work on buses, engines used in powerplants, or other diesel equipment used in serving the public. Some are subject to call for emergencies at any time. Mechanics generally receive a higher rate of pay when they work overtime, evenings, or weekends.

Most larger repair shops are pleasant places in which to work, but some small shops have poor lighting, heating, and ventilation. Diesel mechanics sometimes make repairs outdoors where breakdowns occur. If proper safety precautions are not taken, there is danger of injury when repairing heavy parts supported on jacks or hoists. In most jobs, mechanics handle greasy tools and engine parts. When making repairs, they sometimes must stand or lie in awkward positions.

Many diesel mechanics belong to labor unions, such as the International Association of Machinists and Aerospace Workers; the Amalgamated Transit Union; the Sheet Metal Workers' International Association; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; and the International Brotherhood of Electrical Workers.

Sources of Additional Information

Information about work opportunities in this trade may be available from the local office of the State employment service. Other sources of information are firms that use or service diesel-powered equipment, such as truck and buslines, truck dealers, and construction and farm equipment dealers. Additional information on careers is available from:

International Association of Machinists and Aerospace Workers, 1300 Connecticut Ave. NW., Washington, D.C. 20036.

FARM EQUIPMENT MECHANICS

(D.O.T. 624.281 and .381)

Nature of the Work

Years ago farmers planted, cultivated, and harvested their crops using only handtools and simple animal-drawn equipment. Few repairs were required and if a stray rock or stump broke a plow blade, the metal pieces could be hammered back together by the local blacksmith. Even when tractors began to replace animals as the prime source of power, their simplicity made it possible for most farmers to do their own repair work.

But in the last quarter century farm equipment has grown enormously in size and variety. Many farms have both diesel and gasoline tractors, some equipped with 300-horsepower engines. Other machinery, such as harvesting combines, hay balers, corn pickers, crop dryers, and elevators, also is common. In today's world of mechanized agriculture, few if any types of farming can be done economically without specialized machines.

As farm machinery grew more complex, it became important for the sellers of farm equipment to be able to service and repair the machines they sold. Almost every dealer employs farm equipment mechanics to do this work and to maintain and repair the smaller lawn and garden tractors dealers sell to surburban homeowners.

In addition, some mechanics assemble new implements and machinery for farm equipment dealers and wholesalers, and occasionally they must repair dented or torn sheet metal on the bodies of tractors or other machinery.

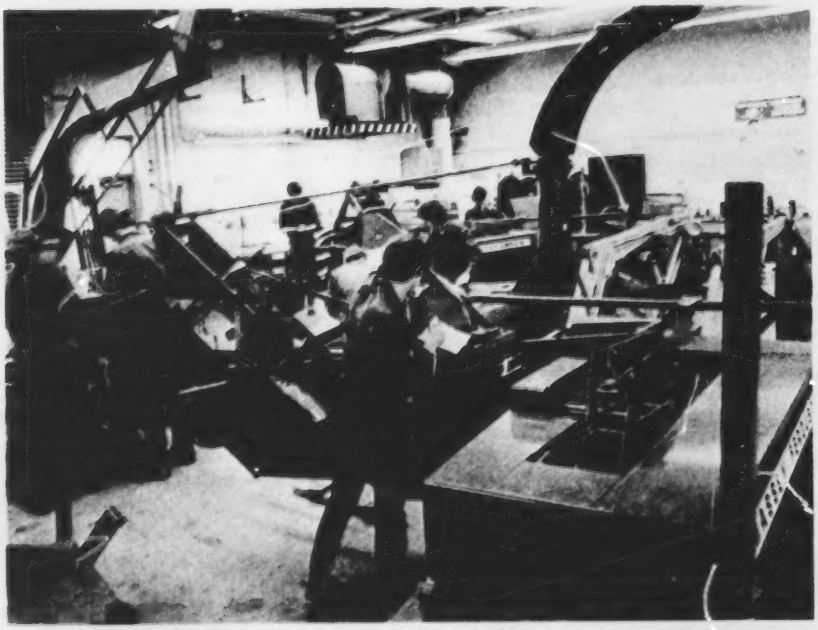
Mechanics spend much of their time repairing and adjusting malfunctioning diesel- and gas-powered tractors that have been brought to the shop. During planting or harvesting seasons, however, the mechanic may travel to the farm to make emergency repairs so that crops can be harvested before they spoil.

Mechanics also perform preventive maintenance. Periodically, they test, adjust, and clean parts and tune engines. In large shops, mechanics may specialize in certain types of work, such as engine overhaul or clutch and transmission repair. Others specialize in repairing the air-conditioning units often included in the cabs of modern tractors and combines, or in repairing certain types of equipment such as hay balers. Some mechanics also repair plumbing, electrical, irrigation, and other equipment on farms.

Mechanics use many simple handtools including wrenches, pliers, hammers, and micrometers. They also may use more complex testing equipment, such as a dynamometer to measure engine performance, or a compression tester to find worn piston rings or leaking cylinder valves. They may use welding equipment or power tools to repair broken parts.

Places of Employment

Most of the estimated 66,000 farm equipment mechanics employed in 1976 worked in service departments of farm equipment dealers. Others worked in independent repair shops, in shops on large farms, and in service departments of farm equipment wholesalers and manufacturers. Most farm equipment repair shops employ fewer than five mechanics, although a few dealerships employ more than 10. A small proportion of farm equipment mechanics are self-employed.



Farm equipment mechanics service most of the equipment used to plant, cultivate, and harvest food.

Because some type of farming is done in nearly every area of the United States, farm equipment mechanics are employed throughout the country. As employment is concentrated in small cities and towns, this may be an attractive career choice for people who do not wish to live the fast-paced life of an urban environment. However, many mechanics work in the rural fringes of metropolitan areas, so farm equipment mechanics who prefer city life need not live in rural areas.

Training, Other Qualifications, and Advancement

Most farm equipment mechanics are hired as helpers and learn the trade on the job by assisting qualified mechanics. The length of training varies with the helper's aptitude and prior experience. At least 2 years of on-the-job training usually are necessary before a mechanic can do most types of repair work, and additional training and experience are required for highly specialized repair and overhaul jobs.

Many farm equipment mechanics enter this occupation from a related occupation. For instance, they may gain experience as farmers and farm laborers, or as heavy equipment mechanics, auto mechanics, or air-conditioning mechanics. People who enter from related occupations also start as helpers, but they may not require as long a period of on-the-job training.

More and more mechanics who enter the trade have had vocational training in rural high schools, in junior and technical colleges, or in the Armed Forces. With the development of more complex farm implements, technical training in electronics has become more important.

A few farm equipment mechanics learn the trade by completing an apprenticeship program, which lasts from 3 to 4 years and includes on-the-job as well as classroom training in all phases of farm equipment repair and maintenance. Applicants for these programs usually are chosen from shop helpers.

Some farm equipment mechanics and trainees receive refresher training in short-term programs conduct-

ed by farm equipment manufacturers. These programs usually last several days. A company service representative explains the design and function of equipment and teaches maintenance and repair on new models of farm equipment. In addition, some dealers may give employees time off to attend local vocational schools that teach special weeklong classes in subjects such as air-conditioning repair or hydraulics.

Employers prefer applicants who have an aptitude for mechanical work. A farm background is an advantage since growing up on a farm usually provides experience in basic farm equipment repairs. Employers also prefer high school graduates, but some will hire applicants who have less education. In general, employers stress previous experience or training in diesel and gasoline engines, the maintenance and repair of hydraulics, and welding—subjects that may be learned in many high schools and vocational schools. Some employers also may require mechanics to be skilled at blueprint reading, because mechanics may have to refer to diagrams of machinery when making complex repairs to electrical and other systems.

Persons considering careers in this field should have the manual dexterity needed to handle tools and equipment. Occasionally, strength is required to lift, move, or hold in place heavy parts. Difficult repair jobs may require problem-solving abilities, so experienced mechanics should be able to work independently with minimum supervision.

Farm equipment mechanics may advance to shop supervisor or manager of a farm equipment dealership. Some mechanics open their own repair shops. A few farm equipment mechanics earn 2-year associate degrees in agricultural mechanics and advance to service representatives for farm equipment manufacturers.

Employment Outlook

Employment of farm equipment mechanics is expected to increase about as fast as the average for all occupations through the mid-1980's. In addition to jobs from employment growth, several hundred job opportunities will arise each year as experienced mechanics retire, die, or transfer to other occupations. Opportunities will be best for applicants who have lived or worked on farms and know how to operate farm machinery and make minor repairs.

The development of more technically advanced farm equipment, some of which will require greater maintenance, will increase the demand for mechanics. For instance, many newer tractors have much larger engines, and feature advanced transmissions of up to 24 speeds. More complex electrical systems also are used to operate the great variety of gauges and warning devices now used to alert the operator to problems such as brake wear, low oil pressure in the transmission, or insufficient coolant in the radiator. Advances such as these and air-conditioned cabs, which have improved the comfort of the operator, have made it more difficult for farmers to do their own repairs. Thus farmers will have to rely more on skilled mechanics in the future.

In addition to the larger and more complex farm machinery, sales of smaller lawn and garden equipment have increased vastly over the past decade and are expected to continue to do so. Most of the large manufacturers of farm equipment now produce a line of these smaller tractors and sell them through their established dealerships. More mechanics will be needed to service this additional equipment.

Earnings and Working Conditions

Average hourly wages of farm equipment mechanics ranged from about $3.50 to $6.35 in 1976, based on the limited information available. However, a few mechanics earned over $15,000 in 1976 because employees are paid time and a half for overtime. Farm equipment mechanics usually work a 44-hour week, which includes 4 hours on Saturday. During planting and harvesting seasons, however, they often work 6 to 7 days a week, 10 to 12 hours daily. In winter months, they may work fewer than 40 hours a week, and some may be laid off.

Mechanics often travel many miles to repair equipment in the field, and are exposed to all kinds of weather. They come in contact with grease, gasoline, rust, and dirt, and there is danger of injury when they repair heavy parts supported on jacks or by hoists. Engine burns and cuts from sharp edges of machinery also are possible.

Very few farm equipment mechanics belong to labor unions, but those who do are members of the International Association of Machinists and Aerospace Workers.

Sources of Additional Information

Details about work opportunities may be obtained from local farm equipment dealers and local offices of the State employment service. For general information about the occupation, write to:

National Farm and Power Equipment Dealers Association, 10877 Watson Road, St. Louis, Mo. 63127.

GASOLINE SERVICE STATION ATTENDANTS

(D.O.T. 915.467)

Nature of the Work

At least once a week, most of the 137 million motor vehicles on the road are driven into gasoline service stations for fuel and service. Most need only a few gallons of gas and a clean windshield, but service station attendants check for other things as well to help owners keep their cars in good condition.

Unless a driver is in a hurry, attendants usually check the oil level in the crankcase and the water levels in the battery and radiator. If the customer asks, they also will check the air pressure in the tires and examine fan belts, hoses, and other parts for signs of excessive wear that could cause problems for the driver.

Besides offering these basic services, many stations also do repair work

Attendant checking the oil level in the crankcase.

and stock replacement parts for often-needed items such as batteries, headlights, and windshield wiper blades. Attendants sell and install these parts, and in some cases, may do minor repair work, such as changing oil, rotating tires, and fixing flats. Most of these tasks can be done using screwdrivers, pliers, wrenches, and other simple handtools. Some attendants, called mechanic-attendants, perform more difficult repairs and use more complex equipment including motor analyzers and wheel alignment machines.

When customers pay for their purchases or repair work, attendants collect payments and make change or prepare charge slips.

Attendants also may keep the service areas, building, and restrooms clean and neat. In some stations, they help the station manager take inventory of automobile parts in stock, set up displays, and keep business records.

If a service station provides emergency road service, attendants may drive a tow truck to the site of the breakdown to "boost" the battery, change a flat tire, or perform other minor repairs. If they cannot fix the car on the spot, they tow it back to the station.

Places of Employment

About 420,000 people worked as gasoline service station attendants in 1976. About one-third of these were part-time employees. In addition to attendants, more than 200,000 gasoline service station managers and owners did similar work.

Service station attendants work in every section of the country, and in every size community, from rural areas to the largest cities.

Training, Other Qualifications, and Advancement

Applicants for jobs as gasoline service station attendants should have a driver's license, a general understanding of how an automobile works, and some sales ability. They should be friendly, able to speak well, and present a generally neat appearance. They also need self-confidence. Applicants should know simple arithmetic so they can make change quickly and accurately and help keep business records. They also should be familiar with local roads, highways, and points of interest in order to give directions to customers and to locate cars whose owners have called for road service.

Although completion of high school is not generally a requirement for getting an entry job, it is an advantage because it indicates to many employers that the person has at least some of the traits of a good worker, such as the ability to stay with a job until the work is completed. A high school education usually is required for service station management training programs conducted by oil companies.

Service station attendants receive most of their training on the job, although there are some formal training programs. Trainees do relatively simple work at first, such as cleaning the station, pumping gas, and cleaning windshields. Gradually, they progress to more advanced work such as performing preventive maintenance, installing accessories on cars, and helping to keep the station records. It usually takes from several months to a year for a beginner to become familiar with and able to perform all the the jobs around a service station.

Formal training programs for gasoline service station work are offered in many high schools around the country. In this curriculum, students in their last 2 years of high school take business education courses and work part time in gasoline service stations, where they receive instruction in all phases of service station work.

Some attendants are enrolled in formal training programs for service station managers, which are conducted by most major oil companies. These programs usually last from 2 to 8 weeks and emphasize subjects such as simple automobile maintenance, marketing, and business management.

Several avenues of advancement are open to service station attendants. Additional training qualifies attendants to become automobile mechanics; those having business management capabilities may advance to station manager. Many experienced station managers and automobile mechanics go into business

for themselves by leasing a station from an oil company or buying their own station. Oil companies hire some service station managers as sales representatives or district managers.

Employment Outlook

Employment of gasoline service station attendants should continue to grow over the next few years. But whether this trend will continue through the mid-1980's is difficult to judge. Increased sales of cars that offer better gas mileage could eventually reduce total gasoline consumption, which might severely limit growth in this occupation over the long run. Self-service gas stations also may limit growth. However, in this relatively large occupation, thousands of job openings are expected each year to replace workers who retire or die. Turnover also is high, so thousands more openings will arise each year as attendants transfer to other occupations.

Earnings and Working Conditions

Earnings of gasoline service station attendants vary considerably. Hourly earnings for many attendants ranged from $2.30 to $4 in 1976, according to the limited information available. In addition, many attendants are paid a commission based on the value of the products they sell. Attendants employed in large metropolitan areas generally had higher earnings than those in small towns.

Full-time attendants work 40 hours a week or more. Because gas stations usually are open at least 12 hours a day, 6 days a week, work schedules may include evenings, weekends, and holidays.

Attendants work outdoors in all kinds of weather. They do considerable lifting and stooping and spend much time on their feet. Possible injuries include cuts from sharp tools and burns from hot engines.

For many attendants, however, the opportunity to deal with people, to work on cars, and possibly to manage their own service stations someday more than offsets these disadvantages. Also, the opportunity to get part-time employment makes the job attractive to many people. Some college students have been able to work their way through school as service station attendants and many who hold other jobs add to their income by working part time as attendants.

Sources of Additional Information

For more details about work opportunities, contact local gasoline service stations or the local office of the State employment service.

MOTORCYCLE MECHANICS

(D.O.T. 620.281 and .384)

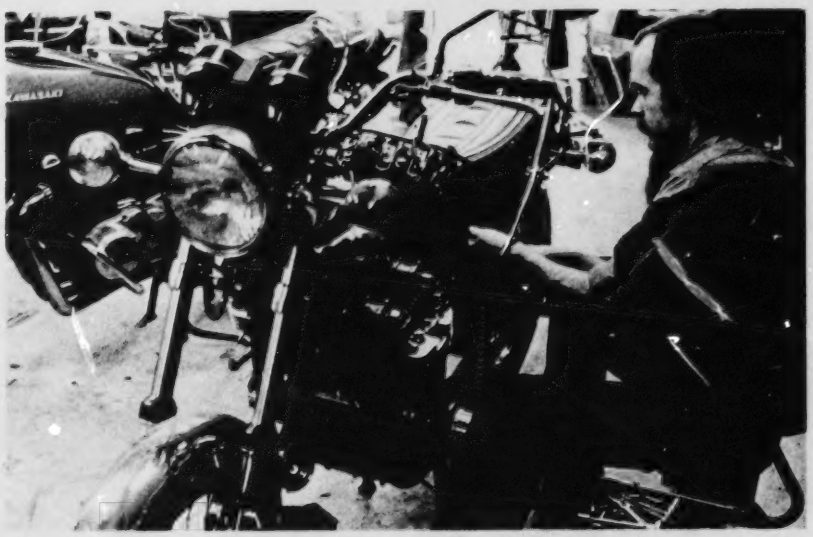
Nature of the Work

In 1950 there were just over 500,000 motorcycles in the United States. Today there are over 5 million. Accompanying this rapid rise in the number of motorcycles has been a rapid increase in the number of motorcycle mechanics. For although many cycling enthusiasts repair their own vehicles, most rely on skilled mechanics.

Motorcycles, like automobiles, need periodic servicing to operate at peak efficiency. Spark plugs, ignition points, brakes, and many other parts frequently require adjustment or replacement. This routine servicing represents the major part of the mechanic's work.

The mark of a skilled mechanic is the ability to diagnose mechanical and electrical problems and to make repairs in a minimum of time. In diagnosing problems, the mechanic first obtains a description of the symptoms from the owner, and then runs the engine or test-rides the motorcycle. The mechanic may have to use special testing equipment and disassemble some components for further examination. After pinpointing the problem, the mechanic makes needed adjustments or replacements. Some jobs require only the replacement of a single item, such as a carburetor or generator, and may be completed in less than an hour. In contrast, an overhaul may require several hours, because the mechanic must disassemble and reassemble the engine to replace worn valves, pistons, bearings, and other internal parts.

Mechanics use common handtools such as wrenches, pliers, and screwdrivers, as well as special tools for getting at parts that are hard to remove such as flywheels and bearings. They also use compression gauges, timing lights, and other kinds of testing devices. Hoists are used to lift heavy motorcycles.



Many motorcycle mechanics also repair minibikes and snowmobiles.

Most mechanics specialize in servicing only a few of the more than 30 brands of motorcycles and motor scooters. In large shops, some mechanics specialize in overhauling and rebuilding engines and transmissions, but most are expected to perform all kinds of repairs. Mechanics may occasionally repair mini-bikes, go-carts, snowmobiles, outboard motors, lawnmowers, and other equipment powered by small gasoline engines.

Places of Employment

About 12,000 persons had full-time jobs as motorcycle mechanics in 1976, and a few thousand more had part-time jobs. Most mechanics work for motorcycle dealers. Others work for city governments to maintain police motorcycles. A small number of mechanics work for firms that specialize in modifying or "customizing" motorcyles. Most shops employ fewer than five mechanics.

Motorcycle mechanics work in every State and major city. About half work in nine States: California, Michigan, Texas, Ohio, Pennsylvania, Illinois, Florida, Minnesota, and Indiana.

Mechanics who specialize in repairing motorcycles work mainly in metropolitan areas. In smaller cities, motorcycles frequently are repaired by owners or managers of motorcycle dealerships or by mechanics who repair all kinds of equipment powered by small gasoline engines, such as outboard motors and lawnmowers.

Training, Other Qualifications, and Advancement

Motorcycle mechanics usually learn their trade on the job, by picking up skills from experienced workers. Beginners usually start by learning to uncrate, assemble, and road-test new motorcycles. Next, they learn routine maintenance jobs such as adusting brakes and replacing spark plugs and ignition points. As trainees gain experience, they progress to more difficult tasks such as repairing electrical systems and overhauling engines and transmissions. Generally, 2 to 3 years of training on the job are necessary before trainees become skilled in all aspects of motorcycle repair.

Trainees usually accumulate handtools as they gain experience. Experienced mechanics often have several hundred dollars invested in tools.

Employers sometimes send mechanics and experienced trainees to special training courses conducted by motorcycle manufacturers and importers. These courses, which can last as long as 2 weeks, are designed to upgrade the worker's skills and provide information on repairing new models.

When hiring trainees, employers look particularly for cycling enthusiasts who have gained practical experience by repairing their own motorcycles. However, many employers will hire trainees with no riding experience if they have mechanical aptitude and show an interest in learning the work. Trainees must be able to obtain a motorcycle driver's license so they can deliver newly assembled motorcycles and test drive those brought in for repairs.

Most employers prefer high school graduates, but will accept applicants with less education. Courses in small engine repair—offered by some high schools and vocational schools—generally are helpful, as are courses in automobile mechanics, science, and mathematics. Many motorcycle dealers employ students to help assemble new motorcycles and perform minor repairs.

Public schools in some large cities offer postsecondary and adult education in small engine and motorcycle repair. Some technical schools have training programs for motorcycle mechanics. Many junior and community colleges offer courses in motorcycle repair.

Because all internal combustion engines are similar, skills learned through repairing motorcycles can be transferred to other fields of mechanical work. For example, motorcycle mechanics can become automobile, truck, or diesel mechanics after some additional training. However, transferring to one of these occupations would not necessarily mean higher earnings.

Motorcycle mechanics have limited advancement possibilities. Those with supervisory ability may advance to service manager and, eventually, to general manager in large dealerships. Those who have the necessary capital may become dealers.

Employment Outlook

Employment in this relatively small occupation is expected to grow faster than the average for all occupations through the mid-1980's. Openings arising from growth will fluctuate from year to year, however, as motorcycle sales and thus employment of motorcycle mechanics appear to be sensitive to dips in the business cycle. Additional openings will arise from the need to replace experienced mechanics who retire, die, or transfer to other fields of work.

Underlying the anticipated growth in the number of motorcyle mechanics is the continued growth in the number of motorcycles. Increases in the young adult population and in personal income levels will create a demand for more motorcycles, and additional mechanics will be needed to maintain these machines. Also, growth in the numbers of minibikes and snowmobiles will stimulate the demand for mechanics.

Opportunities for employment will be best in larger dealerships, most of which are located in the suburbs of metropolitan areas. Many motorcycle dealers in small cities do not have enough business to hire full-time trainees, but part-time or summer jobs may be available.

Earnings and Working Conditions

Earnings of motorcycle mechanics and trainees vary widely and depend on level of skill, geographic location, season of the year, and employer. Limited information indicates that experienced mechanics employed by motorcycle dealers earned between $4 and $10 an hour in late 1976. Generally, experienced mechanics earned 2 to 3 times as much as trainees.

Some mechanics receive an hourly rate or a weekly salary. Others re-

ceive a percentage—usually about 50 percent—of the labor cost charged to the customer. If a mechanic is paid on a percentage basis, income depends on the amount of work assigned and how rapidly the mechanic completes it. Frequently, trainees are paid on a piecework basis when uncrating and assembling new motorcycles. At other times, they are paid an hourly rate or weekly salary.

Motorcycling increases sharply as the weather grows warmer. As a result, most mechanics work more than 40 hours a week during the summer. Many temporary workers hired to help handle the increased work load work only part time, and are laid off in the fall. However, a large proportion of these are either students or workers with other jobs.

Motorcycle repair shops generally are well-lighted and ventilated, but are noisy when engines are being tested. The work is not hazardous, although mechanics are subject to cuts, bruises, burns, and other minor injuries. Since motorcycles are relatively lightweight and have easily accessible parts, mechanics rarely do heavy lifting or work in awkward positions.

A small percentage of motorcycle mechanics are members of the International Association of Machinists and Aerospace Workers.

Sources of Additional Information

For further information regarding employment opportunities and training, contact local motorcycle dealers or the local office of the State employment service.

TRUCK MECHANICS AND BUS MECHANICS

(D.O.T. 620.281)

Nature of the Work

Commercial vehicles serve an important function in the Nation's economy. Heavy trucks are used by industries, such as mining and construction to carry ore and building materials, while small trucks are used for local hauling. Buses are used for both local and transcontinental transportation, as well as for shipping some goods. Truck and bus mechanics perform the vital role of keeping these vehicles in good operating condition.

Truck and bus mechanics work on both diesel and gasoline engines. However, most mechanics usually repair only one type, because many of the engine components are different. (See the statement on diesel mechanics elsewhere in the *Handbook*.)

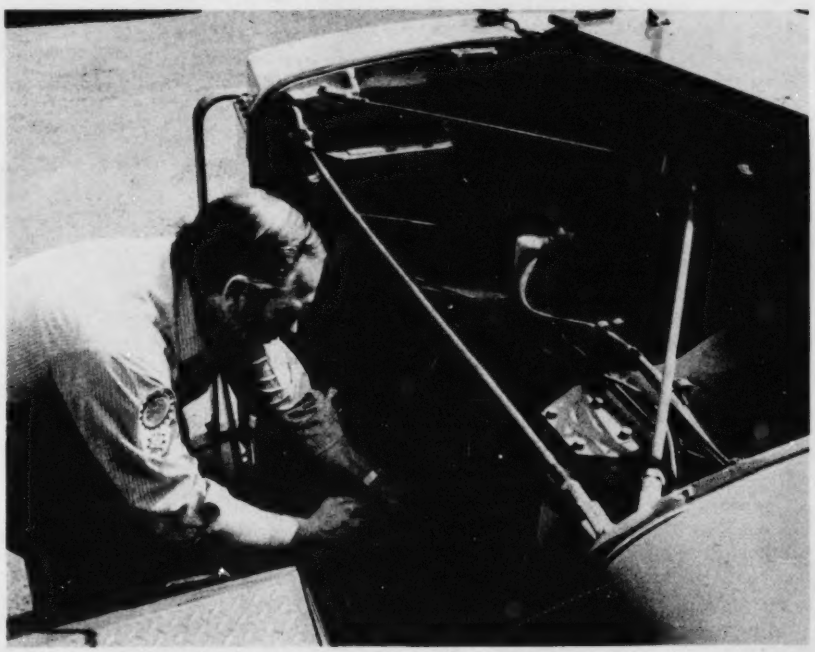
Mechanics who work for organizations that maintain their own vehicles may spend much time doing preventive maintenance to assure safe operation, to prevent wear and damage to parts, and to reduce costly breakdowns. During a maintenance check, they usually follow a regular check list that includes the inspection of brake systems, steering mechanisms, wheel bearings and other important parts. If a part is not working properly, they usually can repair or adjust it. If it cannot be fixed, it is replaced.

In many shops mechanics do all kinds of repair work. For example, they may work on a vehicle's electrical system one day and do major engine repair the next. In some large shops, however, mechanics specialize in one or two types of repair work. For example, one mechanic may specialize in major engine repair, another in transmission work, another in electrical systems and yet another in suspension or brake systems.

Truck and bus mechanics use a variety of tools in their work. They use power tools such as pneumatic wrenches to remove bolts quickly; machine tools such as lathes and grinding machines to rebuild brakes and other parts; welding and flame cutting equipment to remove and repair mufflers and other parts; common handtools such as screwdrivers, pliers, and wrenches to work on small parts and reach hard-to-get-to places; and jacks and hoists to lift and move large parts.

Truck and bus mechanics also use a variety of testing equipment. For example, when working on electrical systems, they may use ohmmeters, ammeters, and voltmeters; to locate engine malfunctions, they often use dynamometers.

For heavy work, such as removing engines and transmissions, two mechanics may work as a team, or a



Some truck and bus mechanics specialize in the repair of diesel engines.

mechanic may be assisted by an apprentice or helper. Mechanics generally get their assignments from shop supervisors or service managers who may check the mechanics work or assist in diagnosing problems.

Places of Employment

A large proportion of the estimated 125,000 truck mechanics employed in 1976 worked for firms that owned fleets of trucks. Fleet owners include trucking companies and businesses that haul their own products such as dairies and bakeries. Other employers include truck dealers, truck manufacturers, truck repair shops, firms that rent or lease trucks, and Federal, State, and local governments.

Most of the estimated 20,000 bus mechanics employed in 1976 worked for local transit companies and intercity buslines. Bus manufacturers employed a relatively small number of mechanics.

Truck and bus mechanics are employed in every section of the country, but most work in large towns and cities where trucking companies, buslines, and other fleet owners have large repair shops.

Training, Other Qualifications, and Advancement

Most truck or bus mechanics learn their skills on the job. Beginners usually do tasks such as cleaning parts, fueling, and lubrication. They may also drive vehicles in and out of the shop. As beginners gain experience and as vacancies become available, they usually are promoted to mechanics' helpers. In some shops, beginners—especially those having prior automobile repair experience—start as mechanics' helpers.

Most helpers can make minor repairs after a few months experience and advance to increasingly difficult jobs as they prove their ability. Generally, 3 to 4 years of on-the-job experience are necessary to qualify as an all-round truck or bus mechanic. Additional training may be necessary for mechanics who wish to specialize in diesel engines.

Most training authorities recommend a formal 4-year apprenticeship as the best way to learn these trades. Typical apprenticeship programs for truck and bus mechanics consist of approximately 8,000 hours of shop training in which trainees obtain practical experience working on transmissions, engines, and other components and at least 576 hours of classroom instruction in which trainees learn blueprint reading, mathematics, engine theory and safety. Frequently, these include training in both diesel and gasoline engine repair.

For entry jobs, employers generally look for applicants who have mechanical aptitude, are at least 18 years of age, and in good physical condition. Completion of high school is an advantage in getting an entry mechanic job because most employers believe it indicates that a person has at least some of the traits of a good worker, such as reliability and perseverance. Employers do not want to spend a lot of time and money training mechanics only to see them quit.

When the mechanic's duties include driving trucks or buses on public roads, applicants may need a State chauffeur's license. If the employer is engaged in interstate transportation, applicants also may have to meet qualifications for drivers established by the U.S. Department of Transportation. These applicants must be at least 21 years of age, in good physical condition, and have good hearing and 20/40 eyesight with or without glasses. They must read and speak English and have a good driving record, including 1 year's driving experience.

Persons interested in becoming truck or bus mechanics can gain valuable experience by taking high school or vocational school courses in automobile and diesel repair. Science and mathematics are helpful since they better one's understanding of how trucks and buses operate. Practical experience in automobile repair from working in a gasoline service station, the Armed Forces, or as a hobby also is valuable.

Most mechanics must buy their own handtools. Experienced mechanics often invest several hundred dollars in tools.

Employers sometimes send experienced mechanics to special training classes conducted by truck, bus, diesel engine, and parts manufacturers. In these classes, mechanics learn to repair the latest equipment or receive special training in subjects such as diagnosing engine malfunctions. Mechanics also may read service and repair manuals to keep abreast of engineering changes.

Experienced mechanics who have leadership ability may advance to shop supervisors or service managers. Truck mechanics who have sales ability sometimes become truck sales representatives. Some mechanics open their own gasoline service stations or repair shops.

Employment Outlook

Employment of truck mechanics is expected to increase about the same as the average for all occupations through the mid-1980's as a result of significant increases in the transportation of freight by trucks. More trucks will be needed for both local and intercity hauling due to the increased production of goods and the necessity of transporting them greater distances and to more places as both population and industrial centers spread out. In addition to the jobs created by employment growth, many openings will arise to replace truck mechanics who retire, die, or transfer to other occupations.

Bus mechanic employment is expected to increase slower than the average for all occupations through the mid-1980's because of offsetting factors affecting the demand for bus service. More buses will be needed for local travel due to increased emphasis on mass transit systems. Intercity bus travel, on the other hand, is expected to remain about the same. Most job openings will result from the need to replace bus mechanics who retire, die, or transfer to other occupations.

Earnings and Working Conditions

Truck and bus mechanics employed by trucking companies, buslines, and other firms that maintain their own vehicles had estimated

average hourly earnings of $6.53 in 1976. By comparison, nonsupervisory workers in private industry, except farming, averaged $4.87.

Beginning apprentices usually earn one-half the rate of skilled workers and receive increases about every 6 months until a rate of 90 percent is reached.

Most mechanics work between 40 and 48 hours per week. Because many truck and bus firms provide service around the clock, mechanics who work for these firms may work evenings, nights, and weekends. When they do, they usually receive a higher rate of pay.

Truck mechanics and bus mechanics are subject to the usual shop hazards such as cuts and bruises. Mechanics handle greasy and dirty parts and may stand or lie in awkward or cramped positions when repairing vehicles. Work areas usually are well lighted, heated, and ventilated, and many employers provide locker rooms and shower facilities. Although most work is done indoors, mechanics occasionally work or make emergency repairs on the road.

Many truck and bus mechanics are members of labor unions, including the International Association of Machinists and Aerospace Workers; the Amalgamated Transit Union; the International Union, United Automobile, Aerospace and Agricultural Implement Workers of America; the Transport Workers Union of America; the Sheet Metal Workers' International Association; and the International Brotherhood of Teamsters, Chauffers, Warehousemen and Helpers of America (Ind.).

Sources of Additional Information

More details about work opportunities for truck or bus mechanics may be obtained from local employers such as trucking companies, truck dealers, or bus lines; locals of unions previously mentioned; or the local office of the State employment service. The State employment service also may have information about apprenticeship and other training programs.

For general information about the work of truck mechanics and apprenticeship training, write to:

American Trucking Associations, Inc., 1616 P St. NW., Washington, D.C. 20036.

What to Look For in this Reprint

To make the *Occupational Outlook Handbook* easier to use, each occupation or industry follows the same outline. Separate sections describe basic elements, such as work on the job, education and training needed, and salaries or wages. Some sections will be more useful if you know how to interpret the information as explained below.

The TRAINING, OTHER QUALIFICATIONS, AND ADVANCEMENT section indicates the preferred way to enter each occupation and alternative ways to obtain training. Read this section carefully because early planning makes many fields easier to enter. Also, the level at which you enter and the speed with which you advance often depend on your training. If you are a student, you may want to consider taking those courses thought useful for the occupations which interest you.

Besides training, you may need a State license or certificate. The training section indicates which occupations generally require these. Check requirements in the State where you plan to work because State regulations vary.

Whether an occupation suits your personality is another important area to explore. For some, you may have to make responsible decisions in a highly competitive atmosphere. For others, you may do only routine tasks under close supervision. To work successfully in a particular job, you may have to do one or more of the following:

- motivate others
- direct and supervise others
- work with all types of people
- work with things—you need good coordination and manual dexterity
- work independently—you need initiative and self-discipline
- work as part of a team
- work with details, perhaps numbers or laboratory reports
- help people
- use creative talents and ideas
- work in a confined area
- do physically hard or dangerous work
- work outside in all types of weather

A counselor can help you find out more about your interests and abilities so you can judge whether a job's characteristics suit you.

The EMPLOYMENT OUTLOOK section tells whether or not the job market is likely to be favorable. Usually an occupation's expected growth is compared to the average projected growth rate for all occupations (20.1 percent between 1976 and 1985). The following phrases are used:

Much faster	50% or more
Faster	25.0 to 49.9%
About as fast	15.0 to 24.9%
Slower	4.0 to 14.9%
Little change	3.9 to -3.9%
Decline	-4.0% or more

Generally, job opportunities are favorable if employment is growing at least as fast as for the economy as a whole.

But, you would have to know the number of people competing with you to be sure of your prospects. Unfortunately, this supply information is lacking for most occupations.

There are exceptions, however, especially among professional occupations. Nearly everyone who earns a medical degree, for example, becomes a practicing physician. When the number of people pursuing relevant types of education and training and then entering the field can be compared with the demand, the outlook section indicates the supply/demand relationship as follows:

Excellent	Demand much greater than supply
Very good	Demand greater than supply
Good or favorable	Rough balance between demand and supply
May face competition	Likelihood of more supply than demand
Keen competition	Supply greater than demand

Competition or few job openings should not stop your pursuing a career that matches your aptitudes and interests. Even small or overcrowded occupations provide some jobs. So do those in which employment is growing very slowly or declining.

Growth in an occupation is not the only source of job openings because the number of openings from turnover can be substantial in large occupations. In fact, replacement needs are expected to create 70 percent of all openings between 1976 and 1985.

Finally, job prospects in your area may differ from those in the Nation as a whole. Your State employment service can furnish local information.

The EARNINGS section tells what workers were earning in 1976.

Which jobs pay the most is a hard question to answer because good information is available for only one type of earnings—wages and salaries—and not even this for all occupations. Although 9 out of 10 workers receive this form of income, many earn extra money by working overtime, night shifts, or irregular schedules. In some occupations, workers also receive tips or commissions based on sales or service. Some factory workers are paid a piece rate—an extra payment for each item they make.

The remaining 10 percent of all workers—the self-employed—includes people in many occupations—physicians, barbers, writers, and farmers, for example. Earnings for self-employed workers even in the same occupation differ widely because much depends on whether one is just starting out or has an established business.

Most wage and salary workers receive fringe benefits, such as paid vacations, holidays, and sick leave.

Workers also receive income in goods and services (payment in kind). Sales workers in department stores, for example, often receive discounts on merchandise.

Despite difficulties in determining exactly what people earn on the job, the Earnings section does compare occupational earnings by indicating whether a certain job pays more or less than the average for all nonsupervisors in private industry, excluding farming.

Each occupation has many pay levels. Beginners almost always earn less than workers who have been on the job for some time. Earnings also vary by geographic location but cities that offer the highest earnings often are those where living costs are most expensive.

What's an ad for the OOQ doing in a place like this?

The career information contained in the reprint you are reading was taken from the 1978–79 edition of the Occupational Outlook Handbook. But the Handbook is not the only source of useful career information published by the Bureau of Labor Statistics. The Handbook's companion, the Occupational Outlook Quarterly, is published four times during the school year to keep subscribers up to date on new occupational studies completed between editions of the Handbook. The Quarterly also gives practical information on training and educational opportunities, salary trends, and new and emerging jobs—just what people need to know to plan careers.

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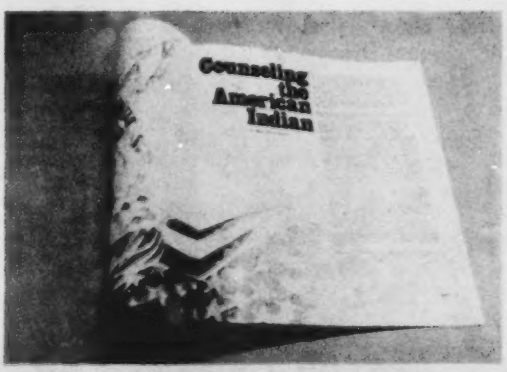

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